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COMPARISON OF GPCI RENTAL INDEX TO THREE SOURCES OF COMMERCIAL OFFICE RENTS

Final Report

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EXECUTIVE SUMMARY

The validity of the physician office rental index used in the Medicare Fee Schedule's Geographic Practice Cost Index (GPCI) has been questioned. Because of lack of suitable national office rental data, the current index is based on the fair market apartment rents (FMRs) established by the U.S. Department of Housing and Urban Development (HUD). This report compares the HUD apartment rents with measures of commercial office rents:

(1) U.S. Postal Service rental data on a sample of almost 18,000 buildings nationally;
(2) General Services Administration (GSA) rental data on a sample of approximately 6,500 buildings; and
(3) office rents reported by the Building Owners and Managers Association (BOMA) for 38 cities.

Of these three alternative sources of office rents, only the postal service data contain a sample with broad enough geographic coverage to compare with the HUD fair market rents on a nationwide basis. Relative post office and HUD FMRs differ by only a few percentage points across metropolitan area population size and rural categories, implying that relative commercial and apartment rents do not vary systematically by urbanicity. Post office rents, however, are relatively higher in the Northeast and lower in the Midwest than HUD rents. Post office rents and FMRs are highly correlated across states (correlation coefficient = 0.85), but the postal rents (index min = .41, max = 2.62) have a greater range than the HUD rents (index min = .65, max = 1.79). Index values for some states are quite different, primarily because of random small-sample variation or regional differences. HUD rents are highly correlated with post office, GSA, and BOMA indexes of rental costs across 48 large metropolitan areas (correlations range from 0.73 to 0.89). Hence, cities that have high apartment rents also tend to have high commercial office rents. However, apartment rents (index min = 0.74, max = 1.63) are less variable across cities than commercial office rents (e.g., post office index min = 0.54, max = 1.83). Some cities have fairly different commercial rental indexes than apartment rental indexes.

The metropolitan area with the greatest difference between the HUD rental index and the commercial office rental indexes is New York City. Use of the HUD FMRs for New York City has been questioned because residential rent control may artificially depress the HUD apartment rents. The HUD index for New York is lower than the three commercial rental indexes, although commercial rents are measured imprecisely given the small sample sizes on which they are based. For example, the HUD New York City index is not statistically different from the post office index. Moreover, our earlier analysis of physician office expenses per square foot reported on the 1988 HCFA Physician Practice Cost and Income Survey does not support an upward adjustment for New York (see Pope *et al.*, 1994, Section II-4.). Samples of commercial buildings for individual boroughs are so small that no conclusions can be reached about inter-borough rental variation within New York City.

None of the commercial office rental indexes are credible alternatives to the HUD fair market rents for use in the Medicare Fee Schedule geographic adjustment factor. BOMA and GSA rents are not available for all areas. Post office rents are available for almost all counties, but the sample size is much smaller than the HUD fair market rent sample, leading to greater variation across areas in the post office rents. The HUD FMRs are a proxy measure of relative physician office space rents. However, no available commercial office rental data shares the HUD FMR advantages of availability for all areas, large sample sizes, standardization for building size and quality, and regular updates.

1.0 INTRODUCTION

The Geographic Practice Cost Index (GPCI) is an input price index used to adjust Medicare Fee Schedule payments for geographic variations in physicians' practice costs. The GPCI has three components: physician work, practice expense, and malpractice insurance. The practice expense GPCI, in turn, has three components:

1. nonphysician employee wages;
2. office rent; and
3. supplies, equipment, and miscellaneous inputs.

The office rental index of the practice expense GPCI measures the relative price of office space in different areas. Because of the unavailability of valid and reliable physician or commercial office rental data for each physician payment locality, relative residential apartment rents have been used to proxy relative physician office rents in the GPCI. The current office rental index is based on the "fair market" apartment rents established by the Department of Housing and Urban Development for Metropolitan Statistical Areas and nonmetropolitan counties. The fair market rents have the desirable attributes of precision, since they are benchmarked from a census of housing units, and availability for all areas. On the other hand, they may not reflect relative rents of physicians who locate in commercial office buildings, and could be biased by variations in apartment type or quality in different areas of the nation.

Previous searches for office rental information are described in Zuckerman, Welch, and Pope (1987), Dayhoff and Pope (1990), and Zuckerman, Miller, Wade, and Pauly (1992). Limitations of surveys of private commercial rents are discussed in detail in Pope et al (1994). Given these limitations, and a continuing desire to validate the HUD FMRs with data on commercial rents, HCFA has acquired rental information on federal office buildings from two government sources: the U.S. Postal Service and the General Services Administration (GSA).

In this report, we assess the fair market rents by comparing them to these two alternative measures of relative office space costs. We also compare HUD FMRs to rents from the most comprehensive of the private commercial surveys. The report is organized as follows. In the next chapter, we describe our data sources, including the fair market apartment rents, post office rental data, GSA rental data, and private commercial rental data from the Building Owners and Managers Association (BOMA). Chapter 3 discusses our methods, including how we normalized rents from the various sources to allow comparisons, and our methods of comparison. Chapter 4 contains results of our comparisons. Chapter 5 discusses implications of our analysis for the GPCI office rental index.

2.0 DATA

2.1 HUD Fair Market Apartment Rents

The office rental component of the 1996 Geographic Practice Cost Index (GPCI) was constructed using the U.S. Department of Housing and Urban Development (HUD) fiscal year 1994 "fair market rents" (FMRs) for two bedroom apartments (Pope et al, 1994). The HUD FMRs are the 45th percentile rent (that is, the rent below which 45 percent of the rental housing units are distributed). In general, the FMR for an area is the amount that would be needed to rent privately-owned, decent, safe, and sanitary rental housing of a modest (non-luxury) nature with suitable amenities. FMRs are available for every metropolitan area (MSA) and rural county in the United States for five apartment sizes. The fair market rents are based on the decennial Census, which is updated each year using American Housing Survey data, CPI data on average annual changes for rentals and utilities, random digit dialing telephone surveys of rents, and reliable area specific data submitted by public commenters. The data thus have two very desirable properties: they are generally based on a survey of thousands of units, rather than on a small sample, and some attempt is made to standardize for unit size and quality across the nation. The data used in this analysis are the fiscal year 1994 HUD FMRs, adjusted by county-specific rental factors within large metropolitan areas (CMSAs) as described in Pope et al (1994).

2.2 U.S. Postal Service Rental Data

HCFA has acquired a file from the U.S. Postal Service containing cost and square footage data on roughly 35,000 buildings nationwide. These buildings are primarily local post offices dealing with the public, although distribution centers and office buildings are included. Data for these buildings include whether the building is leased or owned, the date the lease was effective or the building was purchased, interior square footage of the building, annual rent or purchase price, and building location (zip code).

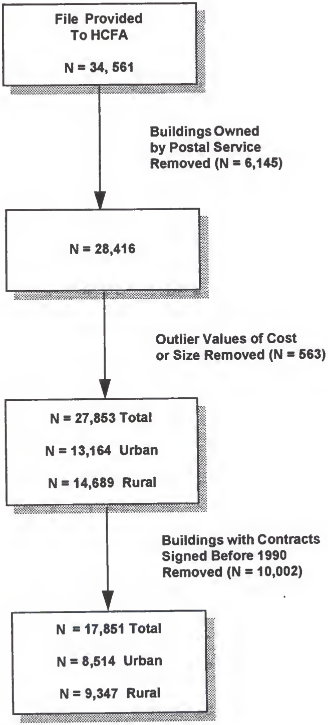
Several characteristics of the post office data make them more promising than any other source of office rental data. First, the file contains data on individual buildings, rather than citywide averages. Thus, data can be examined for outlier values that may be inappropriate to include in the analysis. For example, a small proportion of buildings were coded as containing zero square feet of space. These can be removed from the data before calculating an areawide average or median cost per square foot. Second, the data contain the starting date for the lease on each building. Thus, buildings with less recent leases, which are less likely to reflect current relative rents across areas, can be excluded from the sample. Third, the post office buildings are not heavily concentrated in a few geographic areas. As a result, the post office data contain much more information on smaller cities and rural areas than other office rental surveys. In fact, because of the large number of rural post offices, coverage of rural areas is especially good. Fourth, post offices are widely dispersed into small commercial and residential areas, similar to areas where physicians locate their offices.

Nevertheless, the post office buildings are not designed to be a representative sample of commercial office rents. Nor are they a representative sample of the buildings in which physicians locate their offices. Warehouses--like postal distribution centers are clearly not comparable to physician office space, for example. Also, physicians often locate in residential buildings, whose rents are not measured by the postal data.

Exhibit 2-1 shows the steps that determined the sample used in the analysis of the post office data. The data set acquired from the postal service contained 34,561 observations. Post offices that were owned rather than leased were removed from the sample since purchase prices reflect market conditions only at time of purchase. This trim reduced the sample by roughly 15 percent. Next, we investigated observations that had extremely high or low costs per square foot, calculated as annual rent divided by the interior square footage of the building. Extreme high and low cost outliers resulted from two factors: observations with annual rent reported as one or zero dollars (resulting in a very low cost per square foot) or observations with square footage reported as one or zero feet (resulting in a very high or undefined cost per square foot). It seemed likely that in these cases the entries represent an effort to "fill in the blank" on the rental documentation rather than accurate entries. Roughly two percent of the observations for leased post offices were outliers. Finally, the post office data contained the date the lease was effective. Since we were interested in rents that reflect market conditions for a time frame comparable to the HUD data, we did not want to include in our analysis, for example, the post office in Brooklyn that was leased in 1947. We limited

EXHIBIT 2-1

DETERMINATION OF SAMPLE FOR ANALYSIS OF POST OFFICE RENTAL DATA


File Provided To HCFA
N = 34, 561
Buildings Owned by Postal Service Removed (N = 6,145)
N = 28,416
Outlier Values of Cost or Size Removed (N = 563)
N = 27,853 Total
N = 13,164 Urban
N = 14,689 Rural
Buildings with Contracts Signed Before 1990 Removed (N = 10,002)
N = 17,851 Total
N = 8,514 Urban
N = 9,347 Rural

NOTE: "Ns" refer to sample size of buildings. Urban = metropolitan, rural = nonmetropolitan.

SOURCE: U.S. Postal Service special tabulation.

gpci\postoff\flowcht1.ppt\nab

our analysis to buildings with leases signed in 1990 or later to lessen the range of the leasing dates while not reducing sample size excessively. Our results, however, are not very sensitive to the lease cutoff date.

Table 2-1 presents the distribution of postal building sample sizes for rural and urban counties. Of the 2,334 rural (nonmetropolitan) counties, only 196 (8 percent) contain no buildings in our sample. Eighteen percent of the counties (431) contain six to ten buildings, and another four percent (101) contain more than ten buildings. Among the urban (metropolitan) counties, only 67 (7 percent) contain no post office buildings in our sample, while 471 (54 percent) contain more than five buildings.

2.3 General Services Administration Data

Every five years, the General Services Administration (GSA) conducts a survey of the rents (cost per square foot) paid for buildings it controls across the country. Utilities are included in the rents. Approximately 6,500 buildings are currently included in the survey, representing both urban and rural areas.

The GSA provided HCFA with a file containing 1992 average rents by city[1]. Average rents were calculated by dividing total rent for GSA buildings within the city by total square feet; thus, they can be thought of as average rent per building, weighted by building size. The file also contains average rents by county, calculated in an analogous manner.

This survey has several shortcomings for use in calculating a national rental index for use in the GPCI. First, some GSA-rented space may not be representative of physician office space. Warehouses were removed from the GSA data since they are not typical of the type of space in which physicians locate. However, since we have no information on individual buildings we cannot exclude those with extremely high or extremely low rents that may be indicative of buildings of different types. We are also limited to mean rents, which are more sensitive to outliers than median rents. Second, the mix and location of GSA-rented buildings may vary substantially from area to area. For example, if GSA-rented buildings in one county were all prime office space and buildings in another county were all small commercial buildings, an index based on the GSA data would be an inaccurate indicator of relative rents. A third shortcoming of the GSA data is that unlike the HUD FMRs, GSA rents are not available for all counties. In fact, 33 percent of all urban (metropolitan) counties and

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[1] Although GSA rents are for 1992, leases on which rents are based could have been signed in any year.

TABLE 2-1

DISTRIBUTION OF POSTAL SERVICE BUILDINGS BY COUNTY

	NUMBER OF COUNTIES	
Number of Buildings	Urban	Rural
0	67	196
1	44	308
2	71	333
3	90	372
4	77	363
5	69	230
6-10	224	431
11-100	246	101
>100	1	0
TOTAL COUNTIES	**889**	**2,334**
Total Buildings	8,514	9,347

SOURCE: U.S. Postal Service special tabulation.

69 percent of all rural (nonmetropolitan) counties are not represented in the GSA data. Even counties that contain GSA buildings tend to have small sample sizes of buildings. Table 2-2 presents the distribution of sample sizes for rural and urban counties. Only 233 (26 percent) of all urban counties contain more than five GSA buildings. Only 30 (1 percent) of all rural counties contain more than five GSA buildings; only 138 (6 percent) contain more than two GSA buildings.

2.4 Building Owners and Managers Association (BOMA)

The BOMA Experience Exchange Report: Income/Expense Analysis for Office Buildings provides information on median office rental rates for selected cities. We used the edition that provides 1991 rents. BOMA has over 7,000 members consisting of building owners, managers and real estate companies and has offices in every major city in the nation. BOMA samples its members to develop office rental data for its report; the sample of buildings tends to be dominated by prime commercial office space such as large corporations locate in. BOMA does not generally sample small commercial office strips or residential areas in which physicians often locate. The primary advantage of the BOMA data relative to other private commercial office rental surveys is the number of cities in the sample. Additionally, it includes several relatively small MSAs rather than just the largest markets.

Despite these advantages, BOMA has major shortcomings for our purposes. (See Pope et al, 1994, for a detailed critique.) First, BOMA provides median office rents for downtown and suburban areas. However, the values for both downtown and suburban buildings are not provided for all cities. We constructed a weighted average of the downtown and suburban rents to provide a value for the metropolitan area where the weights were the proportions of the population in the central city and outside the central city, respectively. Even this average is not necessarily representative of the entire MSA. The BOMA report does not specify what they consider downtown or suburban. Ideally, the office rent data would be for the MSA to correspond to the HUD apartment rent data. Second, the type and quality of buildings sampled in each city should be similar. The BOMA data are not, however, based on any standard type or quality of building. Thus, some variations occur because of differences in the average quality/type of buildings across cities. Third, the number of buildings in the sample is highly variable across cities and is often unacceptably small. Although some major metropolitan areas have fairly large samples (for example, in Chicago rents for 186 buildings were reported) others have small samples. For example, the

TABLE 2-2

DISTRIBUTION OF GENERAL SERVICES ADMINISTRATION BUILDINGS BY COUNTY

	NUMBER OF COUNTIES	
Number of Buildings	Urban	Rural
0	293	1,611
1	130	424
2	91	161
3	64	65
4	49	34
5	29	9
6-10	101	27
11-100	130	3
>100	2	0
TOTAL COUNTIES	**889**	**2,334**
Total Buildings	5,128	1,367

SOURCE: General Services Administration special tabulation.

Buffalo MSA, with a population of more than one million, has only 17 buildings reporting. The BOMA rental values contain a large element of random variability given their small, and probably unrepresentative samples. We use the median BOMA rent rather than the mean in our analysis to lessen the effects of random variability.

3.0 METHODS

3.1 Sample Size and Measurement Accuracy

One advantage of HUD FMRs is that they are based on large sample sizes of rental units from throughout metropolitan areas or counties. Table 3-1 reports sample sizes and confidence intervals of two-bedroom rents paid by recent movers for selected metropolitan counties from HUD's special tabulation of the 1990 Census. Although the FY94 FMRs used in the GPCI may not be based solely on the 1990 Census (HUD uses several additional surveys), Table 3-1 provides a representative indication of the sample sizes and precision of the FMRs. Sample sizes vary with county population, but typically number well into the thousands for these metropolitan counties. Confidence intervals are correspondingly small.

In contrast, sample sizes for the post office, GSA, and BOMA office rental data are often very small, which make reported rents highly sensitive to the particular buildings or agencies that happen to report. That is, mean or median office rent for an area is estimated from post office, GSA, or BOMA data with considerable random measurement error. In Section 4, we compare the HUD FMR index with indexes computed from postal service, GSA and BOMA rents. Differences among the indexes should be interpreted cautiously because of the large amount of random error in the office rental indexes. Ideally, we would display standard errors for each index value and conduct tests of the statistical significance of their differences. Unfortunately, we cannot calculate standard errors (or confidence intervals) for GSA and BOMA rents since we do not have rents for individual buildings. Also, we do not know the standard errors of the HUD FMRs because they are computed by HUD from several data sources (but Table 3-1 gives an idea of FMR confidence intervals). We do show confidence intervals for the post office rents in the New York City area, but the nonparametric method of calculating standard errors for median rents is very tedious, so we did not calculate it for other post office index values.

Instead of standard errors, we report the number of buildings on which each estimate of mean or median rent is based. To illustrate the effects of varying sample sizes on the

TABLE 3-1

SELECTED STATISTICS FROM THE HUD SPECIAL TABULATION OF THE 1990 CENSUS, FOR SELECTED METROPOLITAN COUNTIES

	Number of Apartments[1]	45th Percentile Rent[1]	95 Percent Confidence Interval[1]	1990 Population
Boston NECMA				
Suffolk County	17,895	$812	($799, $825)	663,906
Middlesex County	25,855	$795	($787, $804)	1,398,468
Plymouth County	5,252	$720	($708, $733)	435,276
Chicago CMSA				
Cook County	97,934	$547	($544, $550)	5,105,067
DuPage County	14,037	$669	($662, $676)	781,666
Kendall County	451	$537	($515, $562)	39,413
Dallas-Fort Worth CMSA				
Dallas County	62,820	$496	($493, $499)	1,852,810
Tarrant County	39,919	$462	($459, $465)	1,170,103
Kaufman County	699	$386	($360, $404)	52,220
Los Angeles CMSA				
Los Angeles County	167,661	$764	($760, $767)	8,863,164
Orange County	55,705	$837	($833, $841)	2,410,556
New York CMSA				
Manhattan	17,203	$931	($892, $970)	1,487,536
Brooklyn	30,235	$635	($627, $643)	2,300,664
Bronx	11,613	$537	($521, $556)	1,203,789
Queens	21,422	$755	($745, $765)	1,951,598
Staten Island	3,787	$715	($698, $732)	378,977
Putnam County	794	$893	($850, $936)	83,941
San Francisco CMSA				
San Francisco County	15,662	$890	($879, $901)	723,959
Santa Clara County	31,705	$831	($824, $837)	1,497,577
Napa County	2,195	$655	($641, $668)	110,765

[1] 2-bedroom apartments, recent movers, monthly rent.

SOURCE: HUD Special Tabulation of the 1990 Census.

degree of precision with which commercial rents are measured, we present a hypothetical example in Table 3-2. This example is based on postal service building costs per square foot, with the highest and lowest one percent of the observations trimmed from the sample.[2] This post office sample contains 17,505 observations, with a mean of $6.03 and a standard deviation of 3.99. The standard error of the mean rent for the entire sample, calculated as the standard deviation divided by the square root of the number of observations, is $0.03. This is 0.5 percent of the mean. Table 3-2 illustrates the degree to which the standard error of the mean rent increases as the sample size is smaller, while maintaining the same population mean and standard deviation. For example, a sample of 100 observations has a standard error of 6.6 percent of the mean, and a sample of 25 observations has a standard error that is 13.3 percent of the mean.

Thus, small samples correspond to large confidence intervals for the estimated mean or median rent. Rough confidence intervals are often constructed as plus or minus one or two standard errors from the estimated mean. For a normally[3] distributed variable, the true mean lies within plus or minus one standard deviation about two-thirds of the time, and within plus or minus two standard deviations about 95 percent of the time. Suppose the estimated mean (or median) office rent index for a city is 1.0 with a sample of 25 buildings. Then a confidence interval of plus or minus one standard error is (0.868, 1.133) and a confidence interval of plus or minus two standard errors is (0.734, 1.266). These intervals are quite large and clearly, a sample of 25 buildings is not adequate to estimate the mean or median rent for an area very precisely. Table 3-2 shows that a sample of several hundred buildings is necessary to estimate mean or median rents with any precision, and sample sizes in the thousands (such as are used in the HUD FMRs) are needed to drive the relative standard error under one percent.

Although the sample size varies among commercial rental sources and according to the population of the geographic area for which a mean or median is computed, many of the commercial sample sizes are quite small. Given the results in Table 3-2, standard errors will be quite large for many of the estimated commercial office rental indexes. Thus, even large

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[2] Most of our analysis is based on median rather than mean rents. Examining the precision of the estimated median as a function of sample size is difficult, however. Fortunately, the standard deviation of the mean may approach that of the median when the sample is trimmed (DeGroot, 1975, Section 9.7). Thus, in this hypothetical example, we use the trimmed sample, and present statistics based on the mean. Although only approximate, the standard errors and confidence intervals should apply reasonably well to the median.

[3] By "normally", we mean having a normal distribution in the technical statistical sense of the term. The rental data are too skewed to be normally distributed, so the following probability statements are meant only as rough guides.

TABLE 3-2

SIMULATION OF PRECISION OF ESTIMATED MEAN RENT AS A FUNCTION OF SAMPLE SIZE OF BUILDINGS

Number of Buildings	Standard Error of Mean of $6.03	Standard Error as Percent of Mean	CONFIDENCE INTERVALS AROUND MEAN INDEXED TO 1.000: Plus/Minus One Standard Error	CONFIDENCE INTERVALS AROUND MEAN INDEXED TO 1.000: Plus/Minus Two Standard Errors
17,505	$0.03	0.5 %	(0.995, 1.005)	(0.990, 1.010)
15,000	0.03	0.5	(0.995, 1.005)	(0.990, 1.010)
10,000	0.04	0.7	(0.993, 1.007)	(0.986, 1.014)
5,000	0.06	1.0	(0.990, 1.010)	(0.980, 1.020)
1,000	0.13	2.2	(0.980, 1.020)	(0.960, 1.040)
500	0.18	3.0	(0.970, 1.030)	(0.940, 1.060)
250	0.25	4.1	(0.959, 1.041)	(0.918, 1.082)
100	0.40	6.6	(0.934, 1.066)	(0.868, 1.132)
50	0.56	9.3	(0.907, 1.093)	(0.814, 1.186)
25	0.80	13.3	(0.867, 1.133)	(0.734, 1.266)
10	1.26	20.9	(0.791, 1.209)	(0.582, 1.418)

NOTE: Based on a trimmed sample of post office rents with 17,505 observations. The sample mean rent of $6.03 and standard deviation of $3.99 are assumed to remain constant as sample size varies. See text for discussion.

differences between the HUD FMR and the office rent indexes are not necessarily statistically significant. Much of the observed difference (or similarity) may simply be due to random measurement error in the commercial rental indexes.

3.2 Construction of Rental Indexes

We compared rental indexes constructed from the four data sources described in the previous chapter:

- HUD fair market apartment rents;
- post office rents;
- General Services Administration building rents; and
- Building Owners and Managers Association commercial office rents.

The index of HUD FMRs is the office rental index used in the 1996 practice expense GPCI, based on the fiscal year 1994 FMRs. It is described in detail in Pope et al. (1994). An index of post office rents was constructed in an manner analogous to the construction of the HUD FMR index. First, median rent per square foot for each MSA and rural (nonmetropolitan) rest of state area was obtained, using the sample of postal rents described in Chapter 2. Since the HUD FMRs are 45th percentile apartment rents, median postal rents are more comparable to the HUD rents than mean postal rents. Medians also reduce the sensitivity of the postal index to extremely high or low reported rents. Median MSA/state rural area postal rents were then indexed by dividing by their practice-expense-RVU-weighted national mean.

The limited geographic coverage of the GSA and BOMA rents precluded computation of nationwide indices of rents from these sources. Comparisons of HUD with GSA and BOMA are limited to large metropolitan areas. The method of comparison is described in Section 3.4 below.

3.3 Nationwide Comparisons

Nationwide comparisons show broad differences between indexes that are less subject to random variations caused by small sample sizes. We performed nationwide comparisons of the HUD FMR index and the index of post office rents for three geographic units:

- MSA population size classes,
- Census regions, and
- states.

The five MSA population size classes are:

1. MSAs with population greater than 3 million,
2. MSAs with population of one to 3 million,
3. MSAs with population of 500,000 to one million,
4. MSAs with population less than 500,000, and
5. all rural (nonmetropolitan) counties.

For the 22 localities that are statewide, our state comparisons are equivalent to a comparison by locality. For states that contain multiple localities, aggregation to the state reduces the random error in the post office index that exists for some of the smaller localities. However, numbers of post office buildings are small even for some states.

3.4 Comparison of Indexes for Large Metropolitan Areas

Metropolitan areas with a population of greater than one million are the only areas with sufficient samples of buildings to permit comparisons of the GSA and BOMA rents with the HUD and post office rents. Even for these large cities, the numbers of buildings in the GSA, BOMA, and post office samples are often quite small. HUD, post office, and GSA rents are available for every large metropolitan area. The BOMA survey reports rents for 38 of the 48 MSAs with populations greater than one million. The following procedure was used to put the rents from each source on a comparable scale:

(1) BOMA reports both a downtown and a suburban rent for some cities. A single MSA value was estimated as a population-weighted average of the downtown and suburban 1991 median rents. "Downtown" population was proxied by the MSA's central city population; "suburban" population was the remainder of the MSA's population. The resulting MSA rents were normalized so that the (unweighted) average is 1.000 for the 38 cities reporting rents.

(2) The GSA, post office, and HUD rents per MSA were normalized so that each of their averages is 1.000 for the 38 cities included in the BOMA sample.

We then calculated the deviation of the HUD rental index from the average of the three commercial rental indexes and ranked the MSAs in descending order of this deviation.

3.5 New York City

The HUD FMR rental index for New York City has been questioned because residential rent control may cap apartment rents below market levels, while physicians may face full uncontrolled rents in the commercial sector (Pope et al., 1994). In addition, despite evidence of wide variation in rents within New York City, HUD does not publish distinct FMRs for each borough of New York City. In particular, Manhattan, which is its own Medicare payment locality, has the same FMR as the other boroughs. Pope et al (1994) used a special tabulation of 1990 Census apartment rents to estimate relative rents for each borough, which were utilized in the 1996 practice expense GPCI, but these relative rents have not been validated. In summary, two issues surround the New York City GPCI office rental index:

(1) What is the appropriate rental index for New York City as a whole, on average; and
(2) How much do rents vary by borough within New York City?

The post office, GSA, and BOMA New York City office rental indexes may be compared with the HUD FMR index to provide some evidence of whether the FMRs provide an artificially low estimate of the relative cost of physicians' offices because of residential rent control. In addition, the post office and GSA data contain borough-specific rents that can be used to estimate differences in rents among the five boroughs. From the BOMA data, we could only compute a rental index for the entire New York City MSA. From the post office and GSA data we calculated the median cost per square foot for each of the five boroughs, for New York City as a whole, and for the New York City MSA. The reader should be cautioned that the post office and GSA sample sizes of buildings are small, especially for the individual boroughs, and thus rents are not estimated with a high degree of precision.

4.0 RESULTS

4.1 MSA Population Size and Regional Comparisons

Table 4-1 presents the comparison of average[4] post office and HUD FMR rental indexes for five urban-rural population size classes and four Census regions. Post office sample sizes are large for these regions; rents should not be subject to significant random sampling variation. The differences between the indexes across MSA population classes and rural areas are generally quite small. The largest percentage difference (5.2 percent) is for urban areas with a population greater than 3 million. This indicates that post office rents in the most populous urban areas are slightly higher relative to the national average than are apartment rents. Much of this difference may be due to higher post office rents in New York City (see below). However, for each of the three smaller urban categories, the post office index is slightly lower than the HUD index. The post office and HUD indexes are quite similar, on average, in rural areas. Because the post office survey is the only source of commercial rents that provides a large sample of rural buildings, the validation of the HUD FMRs in rural areas is especially useful.

The bottom panel of Table 4-1 presents average values of the two indexes for the four Census regions. Relative post office and HUD apartment rents vary more among regions than among urban-rural population classes. The post office rental index for the Northeast is 10.3 percent higher than the HUD index, while the post office rental index for the Midwest is 12.6 percent lower than the HUD index. In contrast, the post office indexes for the South and West are quite similar to their HUD counterparts.

4.2 State Comparisons

Table 4-2 presents post office and HUD FMR indexes by state. Post office and HUD rents are highly correlated across states (correlation coefficient = 0.85), but the postal rents have a greater range (min = .41, max = 2.62) than the HUD rents (min = .65, max = 1.79).

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[4] Averages are weighted by practice expense RVUs.

TABLE 4-1

COMPARISON OF POST OFFICE AND HUD FMR INDEXES FOR MSA POPULATION CLASSES AND CENSUS REGIONS (NATIONAL AVERAGE = 1.0)

	Post Office Sample Size	Post Office Index	HUD FMR Index	Difference	Percent Difference
MSA Population					
Greater than 3 million	6,654	1.361	1.294	0.067	5.2 %
One to 3 million	1,270	1.076	1.105	-0.029	-2.6
500,000 to 1 million	431	0.955	0.965	-0.010	-1.0
Less than 500,000	159	0.830	0.863	-0.033	-3.8
Rural					
All rural counties	9,347	0.706	0.690	0.016	2.3
Census Region					
Northeast	3,652	1.359	1.232	0.127	10.3
South	5,732	0.849	0.875	-0.026	-3.0
Midwest	5,648	0.753	0.861	-0.108	-12.6
West	2,755	1.179	1.156	0.023	2.0

NOTE: Index values are averages weighted by practice expense RVUs.

SOURCE: U.S. Postal Services special tabulation; U.S. Department of Housing and Urban Development Fair Market Rents.

TABLE 4-2

COMPARISON OF POST OFFICE AND HUD FMR RENTAL INDEXES BY STATE
(ranked in descending order of difference; national average = 1.0)

State	Post Office Sample Size	Post Office Index	HUD FMR Index	Difference	Percent Difference
Hawaii	48	2.624	1.789	0.835	46.7 %
Alaska	75	1.994	1.191	0.803	67.4
New Mexico	177	1.157	0.812	0.345	42.5
New Hampshire	124	1.438	1.102	0.336	30.5
Washington D.C.	36	1.540	1.214	0.326	26.9
Puerto Rico	69	1.033	0.752	0.281	37.3
West Virginia	385	0.870	0.647	0.223	34.5
Vermont	186	1.207	0.997	0.210	21.0
Massachusetts	329	1.467	1.291	0.176	13.6
Arizona	151	1.051	0.893	0.158	17.7
Connecticut	179	1.527	1.369	0.158	11.5
Pennsylvania	1,076	1.077	0.929	0.148	16.0
New York	1,028	1.531	1.386	0.145	10.5
Kentucky	486	0.829	0.691	0.138	20.0
New Jersey	385	1.562	1.442	0.120	8.3
Rhode Island	52	1.212	1.135	0.077	6.8
California	975	1.399	1.336	0.063	4.7
Montana	201	0.769	0.714	0.055	7.6
North Dakota	212	0.747	0.696	0.051	7.4
Wyoming	71	0.761	0.714	0.047	6.6
Maine	293	0.979	0.954	0.025	2.7
Utah	98	0.760	0.754	0.006	0.7
Arkansas	316	0.694	0.689	0.005	0.8
Mississippi	491	0.684	0.679	0.005	0.7
Georgia	386	0.835	0.850	-0.015	-1.8
Tennessee	271	0.736	0.758	-0.022	-2.9
Florida	341	1.001	1.041	-0.040	-3.8
Illinois	784	0.968	1.028	-0.060	-5.9
Louisiana	210	0.666	0.727	-0.061	-8.4
Alabama	396	0.636	0.703	-0.067	-9.5
Maryland	257	1.059	1.128	-0.069	-6.1
South Carolina	211	0.700	0.775	-0.075	-9.6
Delaware	30	0.947	1.029	-0.082	-8.0
Oregon	231	0.800	0.882	-0.082	-9.3
Colorado	220	0.789	0.872	-0.083	-9.5
Ohio	753	0.728	0.813	-0.085	-10.5
Washington	308	0.890	0.978	-0.088	-9.0
Virginia	496	0.896	0.985	-0.089	-9.1
Guam	2	1.505	1.598	-0.093	-5.8
Michigan	491	0.841	0.936	-0.095	-10.2
Missouri	618	0.643	0.751	-0.108	-14.4
North Carolina	515	0.683	0.792	-0.109	-13.8
South Dakota	190	0.629	0.741	-0.112	-15.1
Indiana	401	0.678	0.806	-0.128	-15.9
Idaho	137	0.634	0.762	-0.129	-16.9
Wisconsin	462	0.699	0.831	-0.132	-15.9
Nevada	63	0.916	1.068	-0.152	-14.3
Iowa	576	0.600	0.759	-0.159	-21.0
Oklahoma	315	0.546	0.717	-0.171	-23.9
Minnesota	435	0.707	0.889	-0.182	-20.5
Texas	848	0.662	0.851	-0.189	-22.2
Kansas	420	0.526	0.752	-0.226	-30.0
Nebraska	307	0.481	0.761	-0.280	-36.8
Virgin Islands	3	0.408	1.090	-0.682	-62.5
Standard Deviation	--	0.405	0.252	0.153	60.7
Range	--	2.216	1.142	1.517	129.9

SOURCE: U.S. Postal Service special tabulation; U.S. Department of Housing and Urban Development FY94 Fair Market Rents

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Even at the state level, post office samples sizes can be small. Eleven states (counting Guam, Puerto Rico, and the Virgin Islands as states) contain fewer than 100 post office buildings and another seven contain between 100 and 200 buildings. Small post office samples may explain several of the large differences between the HUD and post office indexes. Four of the six states for which the absolute value of the difference between the indexes is greater than 0.300 have samples of fewer than 100 post office buildings. Random variability may largely explain the substantial differences between the post office and HUD indexes for Hawaii, Alaska, the District of Columbia, and the Virgin Islands, and may play a substantial role in many of the other differences.

States in the Northeast tend to have relatively high post office indexes, as would be expected given the findings above for the four regions. For example, the post office index is 10-20% higher than the HUD index in the populous states of Massachusetts, Pennsylvania and New York. Conversely, the Midwest states of Nebraska, Kansas, Minnesota, Iowa, and Wisconsin all have post office indexes that are much lower than their HUD indexes.

4.3 Large Metropolitan Areas

To compare relative HUD FMRs with relative commercial rents for geographic areas that were likely to have reasonably large sample sizes, we constructed indexes of FMR, post office, GSA, and BOMA rents for metropolitan areas with populations greater than one million. Each index is normalized to have an unweighted mean of 1.000 for the cities in the BOMA sample. The correlation of the indexes across the 48 cities is presented in Table 4-3. The correlations are all high, ranging from 0.73 for the GSA and HUD indexes, to 0.89 for the Post Office and HUD indexes. Table 4-4 shows standard deviations and ranges for the four

TABLE 4-3

CORRELATIONS AMONG RENTAL INDEXES FOR
MSAS WITH POPULATION OF MORE THAN ONE MILLION

	BOMA Index	GSA Index	Post Office Index
BOMA index	1.00		
GSA Index	0.83	1.00	
Post Office index	0.81	0.74	1.00
HUD index	0.76	0.73	0.89

indexes. The HUD index, with a minimum of 0.709 and maximum of 1.632, has a smaller range than each of the other three indexes. It also has a smaller standard deviation. Thus, while the same cities tend to have relatively high or low rents in the four rental sources, the HUD index is less variable. Greater variability of commercial rents is probably random error due to smaller sample sizes.

TABLE 4-4

VARIABILITY OF RENTAL INDEXES FOR MSAS WITH POPULATION OF MORE THAN ONE MILLION

	Standard Deviation	Range	Minimum	Maximum
HUD index	0.26	0.923	0.709	1.632
BOMA index	0.28	1.474	0.556	2.030
GSA index	0.29	1.457	0.552	2.009
Post office Index	0.37	1.285	0.548	1.833

Table 4-5 presents sample sizes and index values for metropolitan areas with populations greater than one million. Cities are ranked in descending order of the difference of the HUD index from the average of the three commercial rental indexes (post office, GSA, and BOMA). In 20 cities, or nearly half the total, the HUD index differs from the average of the commercial indices by less than 10 percentage points (<0.100). In only six cities does the HUD index differ from the mean commercial rental index by more than 20 percentage points (>0.200). The largest difference is New York City (-0.480), where the HUD apartment rents are only 45 percent greater than the large city average, whereas BOMA and GSA rents are double the average, and post office rents are 76 percent higher. Other large discrepancies are for San Juan (-0.312), San Antonio (0.252), Houston (0.238), Sacramento (-.207), and Denver (0.201).

Thus, despite high overall correlations between the HUD index and the commercial rental indexes, for individual MSAs there may be substantial differences among the index values. These may result from several factors. First, we reiterate that even for these large MSAs, commercial building sample sizes tend to be small. Much of the observed differences among the indexes may be due to random errors in measuring median or mean commercial rents for an metropolitan area because of a small sample of buildings in the post office, GSA, and BOMA data. Second, the surveys contain data from slightly different time frames. The HUD rents pertain to fiscal year 1994. The BOMA sample is from 1991, the post office

TABLE 4-5

COMPARISON OF RENTAL INDEXES FOR MSAS WITH POPULATIONS OF MORE THAN ONE MILLION
(1.0 = MSA average)

	SAMPLE SIZE			INDEX[1]				
MSA	BOMA	GSA	Post Office	BOMA	GSA	Post Office	HUD	HUD Deviation From Mean[2]
New York	62	108	157	2.030	2.009	1.759	1.453	-0.480
San Juan	–	280	31	–	1.076	1.037	0.745	-0.312
Sacramento	19	47	61	1.289	1.123	1.212	1.001	-0.207
Baltimore	23	98	76	1.283	1.055	1.018	0.938	-0.181
Chicago	186	105	148	1.188	1.591	1.096	1.125	-0.166
Boston	86	94	287	1.236	1.471	1.449	1.221	-0.165
Newark	–	29	107	–	1.266	1.601	1.282	-0.152
Cleveland	44	47	63	0.889	1.236	0.751	0.812	-0.147
Buffalo	17	30	34	0.955	0.828	1.013	0.789	-0.144
Pittsburgh	63	48	187	0.998	0.861	0.794	0.742	-0.143
Columbus	44	28	60	0.873	1.074	0.741	0.775	-0.120
Fort Lauderdale	–	23	16	–	1.109	1.361	1.117	-0.118
Riverside	–	47	79	–	0.953	1.333	1.032	-0.111
Washington	77	502	217	1.419	1.419	1.493	1.335	-0.109
Philadelphia	71	87	235	1.266	1.007	1.360	1.102	-0.109
Hartford	59	18	60	1.045	1.277	1.324	1.151	-0.065
San Diego	34	65	57	1.037	1.028	1.502	1.125	-0.064
Phoenix	74	57	43	0.724	0.908	1.037	0.831	-0.059
New Haven	–	25	59	–	1.237	1.649	1.395	-0.048
Detroit	41	57	91	1.022	1.044	0.867	0.943	-0.035
Cincinnati	32	36	86	0.742	0.937	0.741	0.781	-0.025
Indianapolis	32	33	55	0.979	0.881	0.644	0.820	-0.014
Salt Lake City	32	39	19	0.788	0.552	0.825	0.709	-0.013
Milwaukee	33	16	46	0.830	1.071	0.690	0.876	0.012
Kansas City	50	80	87	0.889	0.692	0.641	0.774	0.033
Los Angeles	134	135	159	1.375	1.300	1.422	1.399	0.033
Atlanta	108	92	88	0.927	0.815	0.966	0.940	0.038
St. Louis	91	72	118	0.825	0.654	0.681	0.758	0.038
Tampa	32	41	42	0.855	0.848	0.753	0.879	0.061
Portland	44	51	45	0.752	0.855	0.759	0.856	0.068
Charlotte	34	22	44	0.930	0.700	0.618	0.822	0.073
Minneapolis	101	34	91	1.041	0.927	0.741	0.978	0.075
Orange County	–	29	38	–	1.065	1.637	1.428	0.076
Norfolk	–	45	64	–	0.744	0.837	0.882	0.092
Miami	47	62	27	1.102	0.917	1.271	1.193	0.096
New Orleans	–	40	28	–	0.679	0.634	0.759	0.102
San Jose	34	25	23	1.379	1.240	1.689	1.544	0.108
San Francisco	102	63	58	1.395	1.324	1.833	1.628	0.110
Seattle	53	69	58	0.873	0.925	1.000	1.065	0.133
Nassau-Suffolk	–	40	95	–	1.408	1.587	1.632	0.135
Oakland	59	58	64	1.010	1.302	1.203	1.320	0.148
Fort Worth	19	39	32	0.628	0.660	0.770	0.853	0.167
Bergen-Passaic	–	14	55	–	1.196	1.404	1.477	0.177
Dallas	237	61	63	0.754	0.818	0.637	0.917	0.181
Orlando	21	23	24	0.729	0.769	0.901	0.981	0.181
Denver	87	106	32	0.659	0.641	0.679	0.861	0.201
Houston	202	51	47	0.725	0.662	0.593	0.898	0.238
San Antonio	54	37	30	0.556	0.588	0.548	0.816	0.252

[1] All rents are indexed to a mean value of 1.000 for cities available in the BOMA data.

[2] HUD index minus average of BOMA, GSA, and post office indexes.

SOURCE: U.S. Postal Service special tabulation, General Services Administration special tabulation, U.S. Department of Housing and Urban Development Fair Market Rents, BOMA Experience Exchange Report.

sample covers 1990 through 1993, and the GSA data has no restrictions on the year building leases were signed. Given the volatility of commercial rents in response to local business conditions, cyclical variations in relative rents may cause some differences among the four indexes. Third, different types of buildings are measured by the different "office" rental indexes. Buildings in the BOMA sample tend to be corporate office space, whereas post offices are generally not found in such buildings. This may help explain the higher BOMA index for New York, if BOMA includes buildings such as the World Trade Center, which is not typical of the buildings in which post offices (or physicians) locate.

Finally, residential rents appear to be more closely related to per capita income than are office rents. That is, other things equal, relative residential rents tend to be higher in areas with a higher per capita income than are relative office rents. The HUD FMRs may reflect unmeasured differences in the quality of apartment housing across areas that is correlated with the income of the population. For example, the wealthy Nassau-Suffolk MSA's HUD index is 1.63, 12 percent higher than the poorer New York City MSA's HUD index of 1.45. In contrast, post office rents are 11 percent higher in New York City than in Nassau-Suffolk, and GSA rents are 43 percent greater.

4.4 New York City

Table 4-5, discussed in the previous section, indicates that in New York City, relative apartment rents, as measured by the HUD FMR index, are lower than relative commercial rents, as measured by the post office, GSA, or BOMA indexes. Because of its large population, and the possibility that relative residential rents may not accurately measure relative physician office rents because of residential rent control, the New York City area warrants a more detailed analysis. Also, measuring rental variation among New York City boroughs is of interest because Manhattan is a distinct Medicare payment locality with potentially higher rents than the other boroughs.

The BOMA data are available only as aggregates for "downtown" and "suburban" New York City, making it impossible to perform rental comparisons by borough. However, the GSA and post office data are both available by county, allowing us to compare rental indexes for the New York City city limits, and the five individual boroughs, in addition to the metropolitan area (MSA). For these comparisons postal rents have two advantages relative to GSA rents. First, the superior national geographic coverage of the post office data allows New York rents to be compared to national average rents, allowing us to evaluate the overall HUD New York City index value, rather than just compare rents among New York boroughs. Second, the post office data were available to us at the building level, allowing us to construct confidence intervals for our New York post office rental indexes. Approximate 90 percent confidence intervals for post office indexes were calculated using a nonparametric statistical procedure (DeGroot, 1975, p. 472).

Table 4-6 presents HUD and post office indexes for New York.[5] The post office index is about 11 percent higher than the HUD New York MSA rental index (1.727 for post office versus 1.553 for HUD). For the city limits, the post office index is 35 percent higher (1.890 post office versus 1.405 HUD). A HUD study (U.S. Department of Housing and Urban Development, 1991) estimated rent control lowered New York City apartment rents by 11 percent, which is smaller than the discrepancy between the HUD apartment rents and post office commercial rents for the city limits. However, the confidence intervals for the post office indexes are large, and the HUD FMR index falls within the 90 percent confidence interval for both the New York MSA and New York City, albeit at the lower limit of that interval.

The post office rental indexes are higher than the HUD FMR indexes in all New York City boroughs, often by substantial amounts. The largest discrepancies are in the Bronx, Brooklyn, and Manhattan, the smallest in Queens and Staten Island. However, the number of buildings on which the post office median rents are based are very small for the individual boroughs, ranging from 12 to 27. Therefore, the post office data do not measure the median rent precisely; the approximate 90 percent confidence intervals are enormous for the boroughs. The HUD indexes are included in the 90 percent post office confidence intervals for all boroughs.

Earlier, in Table 4-5, we saw that GSA rents in the New York MSA are considerably higher relative to a city average than HUD rents (2.009 GSA versus 1.453 HUD). In Table 4-7, we compare GSA and HUD rental indexes within the New York City area. Both HUD and GSA rents are normalized so that the New York MSA has a value of 1.000. GSA rents are about the same in the city (1.010) and MSA (1.000), while HUD rents are about 10 percent lower in the city (.905 versus 1.000). However, given the small numbers of GSA buildings, these differences are probably not statistically significant. Among the five boroughs, relative GSA and HUD rents are similar, with the exception of Brooklyn, which has a higher GSA

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[5] The index values for the New York City MSA differ from those in Table 4-5 because the indexes are normalized to a national average of 1.000 in Table 4-6, versus a city average of 1.000 in Table 4-5.

TABLE 4-6

COMPARISON OF POST OFFICE AND HUD FMR RENTAL INDEXES FOR NEW YORK CITY
(national average = 1.0)

	POST OFFICE DATA			FY94
	Sample Size	Index Value	(Confidence Interval)/ Significance Level	HUD FMR Index[1]
New York MSA	158	1.727	(1.526, 1.926) / 90 %	1.553
New York City	99	1.890	(1.376, 2.180) / 91	1.405
Bronx	19	1.886	(0.959, 2.815) / 91	1.055
Brooklyn	19	1.925	(0.804, 3.038) / 91	1.248
Manhattan	22	2.561	(1.189, 5.278) / 92	1.829
Queens	27	1.598	(1.272, 1.948) / 91	1.484
Staten Island	12	1.505	(0.654, 3.497) / 91	1.405

[1] Used as the office rental index of the 1996 practice expense GPCI.

SOURCE: U.S. Postal Service special tabulation; U.S. Department of Housing and Urban Development Fair Market Rents.

TABLE 4-7

COMPARISON OF GENERAL SERVICE ADMINISTRATION AND HUD FMR INDEXES FOR NEW YORK CITY (New York MSA average = 1.0)

	GSA Sample Size	GSA Index	HUD Index
New York MSA	108	1.000	1.000
New York City	89	1.010	0.905
Bronx	11	0.653	0.679
Brooklyn	23	1.081	0.804
Manhattan	31	1.148	1.177
Queens	19	1.051	0.956
Staten Island	5	0.954	0.905

NOTE: Both the GSA and HUD rents are indexed so that the New York MSA will have a value of 1.000.

SOURCE: General Services Administration special tabulation; U.S. Department of Housing and Urban Development Fair Market Rents.

index. The small numbers of GSA buildings in each borough (5 to 31), however, imply that GSA rental estimates are subject to a great deal of uncertainty.

5.0 CONCLUSIONS

This report has compared three sources of commercial office rents:

- post office rents,
- General Service Administration rents, and
- Building Owners and Managers' Association rents,

to the HUD "fair market" apartment rental index employed in Medicare's Geographic Practice Cost Index. The goal of the GPCI office rental index is to accurately measure geographic variations in the relative price of office space faced by physicians.

Each of the four rental indexes examined in this report is subject to two fundamental types of error in measuring relative physician office rents: systematic error and random error. Systematic error occurs because none of the four sources of rents measures physician office rents directly. Deviations may occur between relative physician office rents and relative rents of the type of buildings contained in each data source. Apartments and post offices are probably the most similar in location and building type to physician offices. Thus, the HUD FMRs and post office rents are probably subject to less systematic error than the GSA and BOMA rents, which are more representative of large, downtown or suburban office park corporate/government office space than the neighborhood commercial or even residential locations utilized by physicians. Systematic error will be present even with very large samples of buildings to measure rents.

Random error occurs because of the wide variation in rents for individual buildings due to such factors as location and quality of construction. We have shown in this report that a sample of at least several hundred, ideally several thousand, buildings is necessary to precisely measure rents in an area. In general, the HUD FMRs are based on far larger sample sizes than the other sources. They are benchmarked using the decennial Census, which is a census of all housing units in the country.[6] The post office database has the next largest sample size and most extensive geographic distribution of buildings. The GSA and BOMA data are deficient in this regard, with generally small sample sizes and uneven geographic distribution; rents in rural areas are almost absent from these databases.

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[6] The FMRs used in the GPCI are computed only from 2-bedroom apartments occupied by recent movers. Also, between decennial Censuses, HUD uses sample surveys to update the FMRs. These factors greatly reduce the effective sample size on which the FMRs are based. Nevertheless, even with these restrictions, the FMR sample sizes are far larger than those available

Our comparison of relative post office and HUD FMRs showed reasonably good agreement across MSA population size and rural geographic categories. Post office rents, however, are relatively higher in the Northeast and lower in the Midwest than HUD rents. Post office and HUD rents are highly correlated across states (correlation coefficient = 0.85), but the postal rents (min = .41, max = 2.62) have a greater range than the HUD rents (min = .65, max = 1.79). Index values for some states are quite different, primarily because of random small-sample variation or regional differences. Similarly, for a sample of 48 large metropolitan areas, correlations between the HUD index and the post office, GSA, and BOMA indexes are high (ranging from 0.73 to 0.89), but the commercial rental indexes have a greater range and index values can be quite different for individual cities. Commercial rental indices for New York City are higher than the HUD rental index, but sample sizes are so small for individual boroughs that no conclusions can be reached about inter-borough rental variation.

Some of these conclusions are quite different from what we found in comparing the HUD FMRs to physician-reported office expense per square foot on the 1988 HCFA Physician Practice Cost and Income Survey (PPCIS--see Pope et al, 1994, Chapters II-4 and II-5). Although reported physician rent and the FMRs are positively correlated, office expense per square foot is relatively lower than FMRs in the Northeast and higher in the Midwest. Moreover, expense per square foot is less variable across areas than the FMRs, and reported physician office rents are relatively lower in the New York City MSA than the FMRs. These inconsistent results lessen the strength of the implications that can be drawn from the commercial rental analysis.

What, in summary, can be concluded from comparison of the HUD FMRs with the post office, GSA, and BOMA commercial rents? First, the FMRs cannot be replaced with any of the commercial rental sources. The GSA and BOMA data can be immediately disqualified for the GPCI because their geographic coverage is so poor (e.g., almost no rural rents are present in either data source). The post office database has much better geographic coverage, but sample sizes of buildings are often unacceptably small, especially for MSAs, but even for some states.

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from the other sources.

The commercial data sources validate the general patterns in the HUD FMRs fairly well, as evidenced by the high correlation coefficients. MSA population classes, regions, states, or cities that have high FMRs tend to also have high commercial rents. The commercial rent indexes have larger ranges, but this may largely be due to random variation because of small samples. For the GPCI, it seems prudent to rely on a data source--the FMRs--that displays the lowest degree of variation across areas, especially when the greater variation in the other sources may well be due to random small-sample variation.

The most problematic aspect of the FMRs is the low value for the New York City area compared to the commercial rental indexes. This could be the result of residential rent control in New York City. An upward adjustment of 10 percent in the New York City MSA FMR could be justified based on the commercial rental indices, especially the post office rental index, combined with the results of a study of the effect of rent control on New York City residential rents (U.S. Department of Housing and Urban Development, 1991). However, the commercial rent data are not decisive because of their small samples of rents. For example, the HUD rental index for New York falls within the 90 percent confidence interval of the post office index. Moreover, our earlier analysis (see Pope et al, 1994) of reported physician office expense per square foot does not support an upward adjustment for New York. Since the office rental index comprises about 10 percent of the overall Geographic Adjustment Factor (GAF), increasing the New York City office rental index by 10 percent would raise its GAF by 1 percent. It is not clear that this small a change in the GAF warrants a special adjustment for a single area. Other areas might request similar adjustments, leading to a large increase in administrative burden.

In conclusion, we continue to feel that the HUD FMRs, although imperfect, provide the best available data from which to derive the GPCI office rental index. Primary data collection is the only means of improving on the FMRs. However, a rental survey would be expensive, difficult to design, would have to be repeated frequently, and probably would not greatly improve on the FMRs (see Pope et al, 1994, for more discussion of primary data collection).

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